

REMARKS

The claims have been amended by adding the limitations of original claim 16 to claim 1 and by adding the limitations of claim 27 to claim 22 to specify that the passage of water vapor and hydrogen gas from the water vapor generator to the fuel cell is controlled by at least one valve. Claim 15 has been rewritten in independent form as new claim 38, and new claim 39 has been added to specify that the passage of water vapor and hydrogen gas from the water vapor generator to the fuel cell is controlled by at least one pump. Claims 35 and 37 have been amended to specify that the passage of water vapor and hydrogen gas from the water vapor generator to the fuel cell is controlled by at least one valve or at least one pump. Claims 7, 8, 16 and 27 have been cancelled. Neither the Bailey, Jr. et al. nor Taschek references teach or suggest power generators wherein either a valve or a pump regulates vapor or gas flow.

The Examiner has rejected claims 1, 2, 4, 6, 9, 10, 17, 18, 21, 22, 24, 26, 30, 31, 33 and 34 under 35 U.S.C. 102(b) over U.S. patent 4,261,955 to Bailey, Jr. et al. The Examiner has also rejected claims 1, 4, 6, 9, 10, 11, 18, 21, 22, 26, 28, 30, 31, 33 and 34 under 35 U.S.C. 102(b) over U.S. patent 4,155,712 to Taschek. It is respectfully submitted that both of these rejections have been overcome by the instant amendment.

U.S. patent 4,261,955 to Bailey, Jr. et al. and U.S. patent 4,155,712 to Taschek each teach hydrogen gas generators. Bailey, Jr. et al. is described as an improvement over the gas generator disclosed in U.S. patent 4,155,712 to Taschek, and the two patents share a common inventor (Walter G. Taschek). The Bailey Jr. and Taschek references are similar to one another in that each provides a system wherein the flow of water vapor and hydrogen gas are regulated by the flow of water between dual water chambers. Particularly, the hydrogen generators of Bailey and Taschek that are connected by a supply pipe to a water reservoir to continuously replenish the water supply. According to both references, the water reservoir supplies a head pressure that balances increasing gas

pressure in the first water chamber and hydrogen fuel containing chamber, allowing for quick action hydrogen gas shutoff and generation, and for automatic, on demand production of hydrogen gas at a constant pressure feed over widely varying hydrogen gas demand rates. When the fuel cell is in a non-consuming mode, the gas pressure in the fuel chamber increases, thereby increasing the gas pressure in the first water chamber, which forces water out of the first water chamber and back into the water reservoir chamber. When the water leaves the first water chamber, no water vapor passes through the porous membrane, causing hydrogen gas generation to stop. When the fuel cell is shifted into hydrogen consumption mode, the gas pressure in the fuel chamber drops, causing the gas pressure in the first water chamber to drop by pulling gases into the fuel chamber, and forcing water from the reservoir back into the first chamber. This leads to additional water vapor diffusion through the porous membrane and additional hydrogen production. Therefore, in both the Bailey Jr. and Taschek references, the gas flow and gas pressures in the fuel chamber and first water chamber, along with the water reservoir, regulate the flow of water vapor and hydrogen gas by adjusting to compensate for pressure fluctuations in the system, so that hydrogen is produced and withdrawn at the desired rate.

However, each of these applied references are very different than the system of the claimed invention as amended. The electrical power generator of the invention does not have a water reservoir or continuously replenishing water supply, but contains a set quantity of water that contained in a single water chamber. More importantly, the passage of water vapor and hydrogen gas from the water vapor generator to the fuel cell is controlled by at least one valve or at least one pump. Particularly, in the presently claimed invention, when the fuel cell demands the production of hydrogen gas, a valve is opened allowing water vapor to come into contact with the solid hydrogen gas generating fuel, allowing the formation of hydrogen gas. When hydrogen gas is not in demand, a valve is closed, preventing water vapor from coming into contact with the hydrogen generating fuel. Alternately, a pump may be used to pump water vapor into contact with the hydrogen generating fuel and to pump hydrogen gas to the fuel cell.

Neither Bailey, Jr. et al. nor Taschek teach a system that includes either a valve or a pump. This is not disputed by the Examiner as former claims 15, 16 and 27 were not rejected under 35 U.S.C. 102. Accordingly, it is respectfully submitted that the rejections have been overcome by the instant amendment and should be withdrawn.

The Examiner has rejected claims 12, 13 and 29 under 35 U.S.C. 103(a) over Taschek in view of U.S. patent 4,055,632 to Hoffman et al. It is respectfully submitted that the rejection has been overcome by the instant amendment.

Taschek has been discussed above and those arguments are repeated herein. Hoffman et al. teaches a gas generator wherein a solid fuel, such as sodium borohydride, along with a catalyst, reacts with liquid water to generate hydrogen gas. The Examiner has cited Hoffman et al. in order to show that sodium borohydride may be used to generate hydrogen gas, and to show the presence of a reaction catalyst in generating hydrogen gas. The gas generator of Hoffman et al. differs from the presently claimed invention in that a metal hydride is reacted with liquid water, not water vapor, to generate hydrogen gas. Regardless, it is respectfully submitted that the disclosure of Hoffman et al. is insufficient to overcome the differences between the claimed invention and Taschek. Applicant respectfully asserts that a combination of Hoffman et al. and Taschek would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Taschek along with Hoffman et al. For these reasons it is respectfully submitted that the rejection is overcome and should be withdrawn.

The Examiner has rejected claim 14 under 35 U.S.C. 103(a) over Taschek in view of Hoffman et al. and further in view of U.S. patent 6,358,488 to Suda. It is respectfully submitted that the rejection has been overcome by the instant amendment.

Taschek and Hoffman, et al. have been discussed above and those arguments are repeated herein. Suda describes a method for the generation of hydrogen gas by the reaction of a solid metal hydrogen complex compound in an aqueous alkaline solution, such as a 10% aqueous solution of sodium or potassium hydroxide, with a catalyst. The Examiner applies Suda to show that suitable catalysts include cobalt, nickel, ruthenium and alloys and combinations thereof. It is respectfully submitted that the disclosures of Suda and Hoffman et al. are insufficient to overcome the differences between the claimed invention and Taschek. Applicant respectfully asserts that a combination of Suda, Hoffman, et al. and Taschek would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Taschek along with Hoffman et al and Suda. For these reasons it is respectfully submitted that the rejection is overcome and should be withdrawn.

The Examiner has rejected claims 7 and 8 under 35 U.S.C. 103(a) over Bailey, Jr. et al. in view of U.S. pre-grant publication no. 2001/0022960 to Kojima et al. It is respectfully submitted that the rejection has been overcome by the instant amendment.

Bailey, Jr., et al. has been discussed above and those arguments are repeated herein. Kojima, et al. discloses a hydrogen generating method and apparatus where a complex metal hydride is hydrolyzed in the presence of liquid water and a catalyst. The Examiner has cited Kojima, et al. in order to show that the claimed power generator may further include an inert gas within its component chambers. It is respectfully submitted that the disclosure of Kojima, et al. is insufficient to overcome the differences between the claimed invention and Bailey, Jr. et al. Applicant respectfully asserts that a combination of Kojima, et al. and Bailey, Jr. et al. would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Bailey, Jr. et al. along with Kojima, et al. For these reasons it is respectfully submitted that the rejection is overcome and should be withdrawn.

The Examiner has rejected claims 19, 20 and 32 under 35 U.S.C. 103(a) over Bailey, Jr. et al. in view of U.S. patent 5,942,344 to Lehmeier et al. It is respectfully submitted that the rejection has been overcome by the instant amendment.

Bailey, Jr., et al. has been discussed above and those arguments are repeated herein. Lehmeier et al. discloses a high-temperature fuel cell system having a heating element for heating a fuel cell. The Examiner has cited Lehmeier et al. to show that it would be obvious to include a heater with the claimed power generator to heat the fuel cell of the claimed invention. It is respectfully submitted that the disclosure of Lehmeier, et al., particularly the disclosure directed to heating a fuel cell, is insufficient to overcome the differences between the claimed invention and Bailey, Jr. et al. Applicant respectfully asserts that a combination of Lehmeier, et al. and Bailey, Jr. et al. would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Bailey, Jr. et al. along with Lehmeier, et al. For these reasons it is respectfully submitted that the rejection is overcome and should be withdrawn.

The Examiner has rejected claims 3, 23, 25, 35 and 37 under 35 U.S.C. 103(a) over Bailey, Jr. et al. in view of U.S. patent 6,432,566 to Condit et al. It is respectfully submitted that the rejection has been overcome by the instant amendment.

Bailey, Jr., et al. has been discussed above and those arguments are repeated herein. Condit et al. teaches a direct antifreeze cooled fuel cell power plant that includes a thermal management system that directs the flow of a cooling fluid for controlling heat within the plant, including a direct antifreeze solution passing through a water transport plate. The Examiner points out that Condit discloses recycling product water from the fuel cell and/or directing cooling fluid within a coolant system as a vapor into the process

oxidant and/or reducing fluid streams entering the fuel cell. It is respectfully submitted that there is nothing in Condit et al. that together with Bailey, Jr. et al. would teach or suggest an electrical power generator comprising: a) a water vapor generator; b) a hydrogen gas generator attached to the water vapor generator, said hydrogen generator containing a substantially non-fluid substance which reacts with water vapor to generate hydrogen gas; said hydrogen generator optionally being attached to said water vapor generator via at least one conduit; c) a fuel cell attached to the hydrogen gas generator; said fuel cell optionally being attached to said hydrogen gas generator via at least one conduit; and d) a return line which directs residual water vapor and hydrogen gas from the fuel cell to the water vapor generator; and e) at least one valve or at least one pump for regulating the passage of hydrogen gas and water vapor between the water vapor generator and the fuel cell.

The Examiner has cited Condit to show that it would be obvious to direct residual water vapor and residual hydrogen gas from the fuel cell back to the water vapor generator, such as via a return line from the fuel cell. However, it is respectfully submitted that the disclosure of Condit, et al. is insufficient to overcome the differences between the claimed invention and Bailey, Jr. et al. Applicant respectfully asserts that a combination of Condit, et al. and Bailey, Jr. et al. would not teach or suggest the claimed invention to one skilled in the art, and one of ordinary skill in the art would not be able to arrive at the presently claimed invention with a reasonable expectation of success upon a reading of Bailey, Jr. et al. along with Condit, et al. For these reasons it is respectfully submitted that the rejection is overcome and should be withdrawn.

The Examiner has rejected claims 15, 16 and 27 under 35 U.S.C. 103(a) over Bailey, Jr. et al. in view of U.S. pre-grant publication no. 2001/0053469 to Kobayashi et al. It is respectfully submitted that the rejection is incorrect and should be withdrawn.

Bailey, Jr., et al. has been discussed above and those arguments are repeated herein. The Examiner has cited Kobayashi et al. to show that it would be obvious for the claimed

power generator to include a pump or a valve to regulate the passage of hydrogen gas and water vapor between the water vapor generator and the fuel cell. Kobayashi et al. teaches an apparatus for warming-up a fuel cell and further teaches the use of a pump and valves to circulate hydrogen gas throughout their system. It is respectfully submitted that the Examiner has not established a *prima facie* case of obviousness. In determining a *prima facie* case of obviousness, it is necessary to ascertain whether or not the reference teachings would appear to be sufficient for one of ordinary skill in the relevant art having the reference before him to make the proposed substitution, combination, or other modification. *In re Linter*, 458 F.2d 1013, 1016, 173 USPQ 560, 562 (CCPA 1972). To do so, the applied prior art must be such that it would have provided one of ordinary skill in the art with both a motivation to carry out the claimed invention and a reasonable expectation of success in doing so. *See In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991); *In re O'Farrell*, 853 F.2d 894, 902, 7 USPQ2d 1673, 1680 (Fed. Cir. 1988).

Applicant respectfully asserts that having the references before him, one of ordinary skill in the art would not substitute the regulation system of Kobayashi, et al. for the system of Bailey, Jr. et al. Firstly, there is no teaching or suggestion in Bailey, Jr. et al. to include either a valve or a pump as an element for regulating the flow of water vapor and hydrogen gas in the system.. Secondly, Bailey, Jr. et al. is designed as a self-regulating pressure balancing system whose basis of operation is the free flow of gases and liquids that allow for a constant generation of hydrogen gas *without* the use of valves or pumps. To include a valve or pump in the system of Bailey would as described by Kobayashi would alter the entire principal of operation of the Bailey, Jr. If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)

Additionally, including a pump or valve in the system of Bailey, Jr. would render the Bailey, Jr. power generator unsatisfactory for its intended purpose, which is to allow for

quick action hydrogen gas shutoff and generation, and for automatic, on demand production of hydrogen gas at a constant pressure feed over widely varying hydrogen gas demand rates. As described in detail above, the Bailey Jr. system automatically controls itself to regulate the flow of water vapor and hydrogen gas by adjusting to compensate for pressure fluctuations in the system, so that hydrogen is produced and withdrawn at the desired rate. The addition of a pump or valve would only alter the desired balance of gases and liquids that is the foundation of the Bailey, Jr. power generator, not assist or enhance it. If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). It is respectfully asserted that the suggested combination of references would require a substantial reconstruction and redesign of the elements shown in Bailey, Jr. et al. as well as a change in the basic principle under which the Bailey Jr. construction was designed to operate." (See *Id.*, 270 F.2d at 813, 123 USPQ at 352.).

For these reasons it is respectfully submitted that it would not be obvious to one of ordinary skill in the art to combine these references to arrive at the claimed invention, and the disclosure of Kobayashi, et al. is insufficient to overcome the differences between the claimed invention and Bailey, Jr. et al.

Other than Bailey, Jr. et al. and Taschek, the references cited by the Examiner each certainly show the individual components, as well as one or more of the individual steps used in the instant processes. However, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

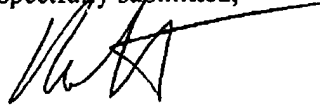
Neither of the Bailey, Jr. et al. and Taschek references show a system wherein the passage of said water vapor and said hydrogen gas from the water vapor generator to the fuel cell

is controlled by at least one valve or at least one pump. Further, neither reference teaches a system having a non-continuously replenishing water supply, with the available quantity of water determined solely by the size of the water vapor chamber itself. This leads to the ultimate utility of the presently claimed invention as a source of electrical energy for powering miniature devices such as cellular phones or other hand held electronic devices, and ultimately larger scale systems such as fuel driven equipment and automobiles. Additionally, due to the nature Bailey, Jr. et al. and Taschek, each of which require an external reservoir of water that alters the water level in their dual-chamber water system, it is impossible to use solid ice as a water source in a water vapor generator as reflected in claim 5, which is indicated as allowable. Accordingly, it is respectfully asserted that each of the rejections have been overcome by the instant amendment, and it is requested that each of the rejections be withdrawn.

Applicant hereby acknowledges that the Examiner's indication that claim 36 is allowed, and that claim 5 is allowable.

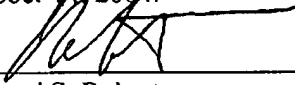
The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,



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I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office, FAX No. (703) 872-9306 on October 14, 2004.



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